



Garden Terms: Plant Classification

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Plants are grouped by similar characteristics to help describe how they look and grow. Morphological and environmental conditions are commonly used to help differentiate plants. Below are some of the most common categories that are used to classify plants in horticulture.

Plant Life Cycles

Annual plants complete their life cycle in one year (Figure 1).

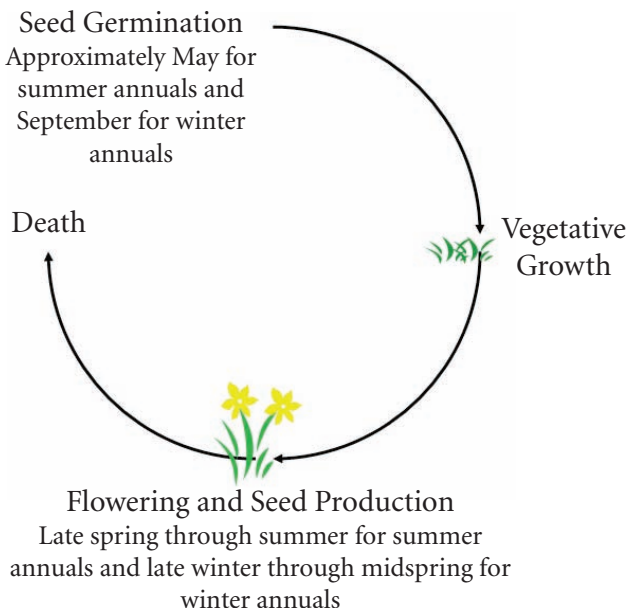


Figure 1. The life cycle of annual plants.

- ❖ **Winter annuals** germinate in the fall and flower and produce seed the following spring. Most winter annuals are considered weeds in landscapes. Examples include henbit, common chickweed, and field pennycress.
- ❖ **Summer annuals** germinate in the spring and flower and produce seed throughout the summer until a hard frost occurs. Examples include crabgrass, sandbur, and tomato.

Biennial plants complete their life cycle in two years. Flowering and seed production occurs in the second year (Figure 2). Examples include damesrocket and Queen Anne's lace.

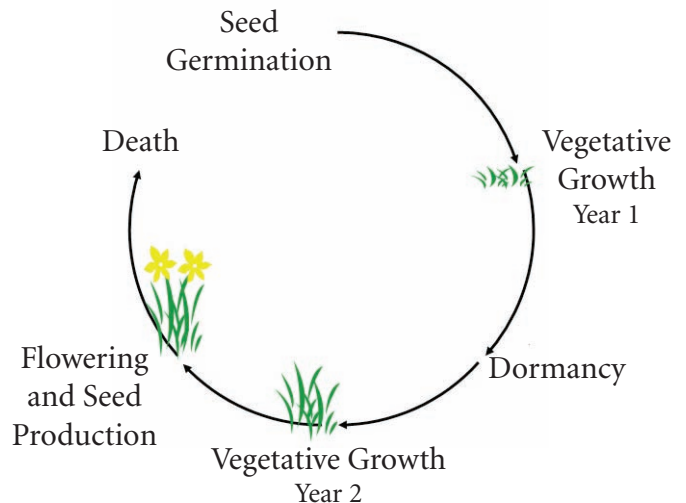


Figure 2. The life cycle of biennial plants.

Perennial plants live for more than two years (Figure 3). They regenerate each year from protected buds.

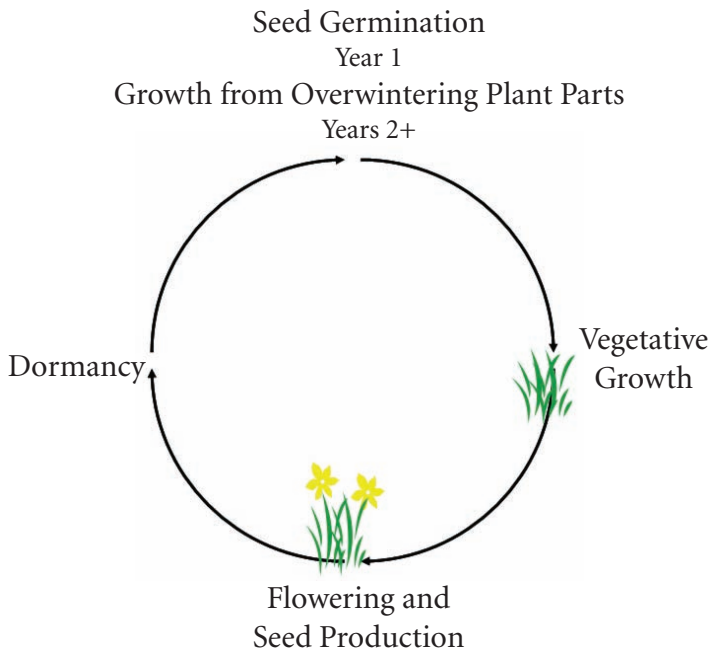


Figure 3. The life cycle of perennial plants.

Plant Classification by Leaf Type

Evergreen plants have leaves that stay green throughout the year. Examples include white pine, meserve holly (Figure 4), and concolor fir.

Deciduous plants have leaves that drop once a year. Many deciduous plants lose their leaves at about the same time each year. For example, ginkgo loses its leaves much earlier than most oaks (Figure 5).



Figure 4. Most evergreen plants have needle-like leaves, but some plants, such as holly (*Ilex* sp.), are broadleaf evergreens. Care of broadleaf evergreens is especially important in late fall through winter since water loss through the leaves can be significant, while water uptake is negligible. Broadleaf evergreens should be planted in the spring in order to help develop a good root system before exposing them to desiccating winter winds.

Semi-evergreen plants may retain leaves for more than one year, depending on environmental conditions. An example is leatherleaf viburnum.

Plant Classification by Stem Type

Woody plants have stems that live for several years, adding new growth (height and width) each year. Woody plants may be classified as trees, shrubs or vines and may have evergreen, semi-evergreen or deciduous leaves.

Herbaceous plants have stems that die back to the ground each year. Herbaceous plants may be annual, perennial or biennial.



Winter



Spring



Summer

Figure 5. The use of evergreen and deciduous plants is important in developing an aesthetically pleasing landscape throughout the year. Evergreens provide framework and visual interest to the landscape during winter and early spring months when other plants are dormant or just beginning growth.

Suffrutescent plants are herbaceous perennial plants that have a woody base and often have semi-woody stems. They perform best when cut back to the base each spring. Examples include bluemist spirea, butterfly bush, and Russian sage.

Plant Classification by Growth Habit

Trees are typically one- to three-stemmed and have mature heights above 15 feet.

Shrubs typically are multi-stemmed and have mature heights below 15 feet.

Vines have a twining, clasping or clinging growth habit.

Groundcovers spread quickly and form a dense cover. They may vary in height and can be herbaceous or woody. Examples include sumac, daylily, and lily-of-the-valley.

Plant Classification by Temperature

Tropical plants live in areas with summerlike conditions year-round. Examples include banana, pineapple, and cashew. Many tropical plants are grown in Nebraska as annuals or houseplants.

Subtropical plants cannot tolerate severe winter conditions but need some winter chilling. Examples include citrus, dates, and olives. Many subtropical plants are grown in Nebraska as annuals or houseplants.

Temperate plants require cold winter chilling conditions as well as a warm summer growing season. Most plants grown in Nebraska landscapes are classified as temperate.

Warm-season plants grow best in warm temperatures, 65°-90°F, and do not tolerate cold temperatures. Planting date is extremely important to avoid plant damage. Examples include buffalograss, peppers, and tomatoes.

Cool-season plants grow best in cool temperatures, 40°-70°F, and most can tolerate light frosts. Examples include Kentucky bluegrass, tall fescue, broccoli, and radish (Figure 6).

Tender plants are not tolerant of cold temperatures or light frosts. Examples include tomato, pepper, squash, and most summer annual flowers.

Hardy plants are able to withstand environmental conditions common of a general location. Temperature is the main consideration in determining a plant's hardiness, although other environmental conditions may influence a plant's ability to survive, including moisture, wind and sun exposure, and soil pH (Figure 7).



Figure 6. In early spring, cool-season turfgrasses and winter annual weeds are green and actively growing, while warm-season perennial grasses, such as buffalograss (on left), are still dormant. Warm-season plants will begin growth later in the spring than cool-season plants because they require warmer soil temperatures. In addition, perennial warm-season grasses will go dormant earlier in the fall than cool-season grasses.



Figure 7. Even hardy plants (*Aquilegia* sp.) can suffer damage when temperatures drop too low. Many hardy plants can tolerate light freezes, but sustained low temperatures over time can cause long-term damage to stems, leaves and flowers. Fortunately, most well-established herbaceous perennial plants will have new growth generated from underground plant parts, and many woody plants will develop new growth from secondary buds.

The United States Department of Agriculture hardiness zones are based on average annual minimum temperatures. Zones range from 1 (below -50°F) to 11 (above 40°F). Nebraska is in zones 4 and 5 (Figure 8). Perennial plants with a hardiness zone designation greater than the hardiness zone for a specific location are not considered hardy. For example, zone 7 plants would not be hardy in Nebraska because Nebraska is in zones 4 and 5.

American Horticultural Society heat zones indicate the average number of days each year that an area experiences temperatures over 86°F. Zones range from 1 (less than one heat day) to 12 (more than 210 days).

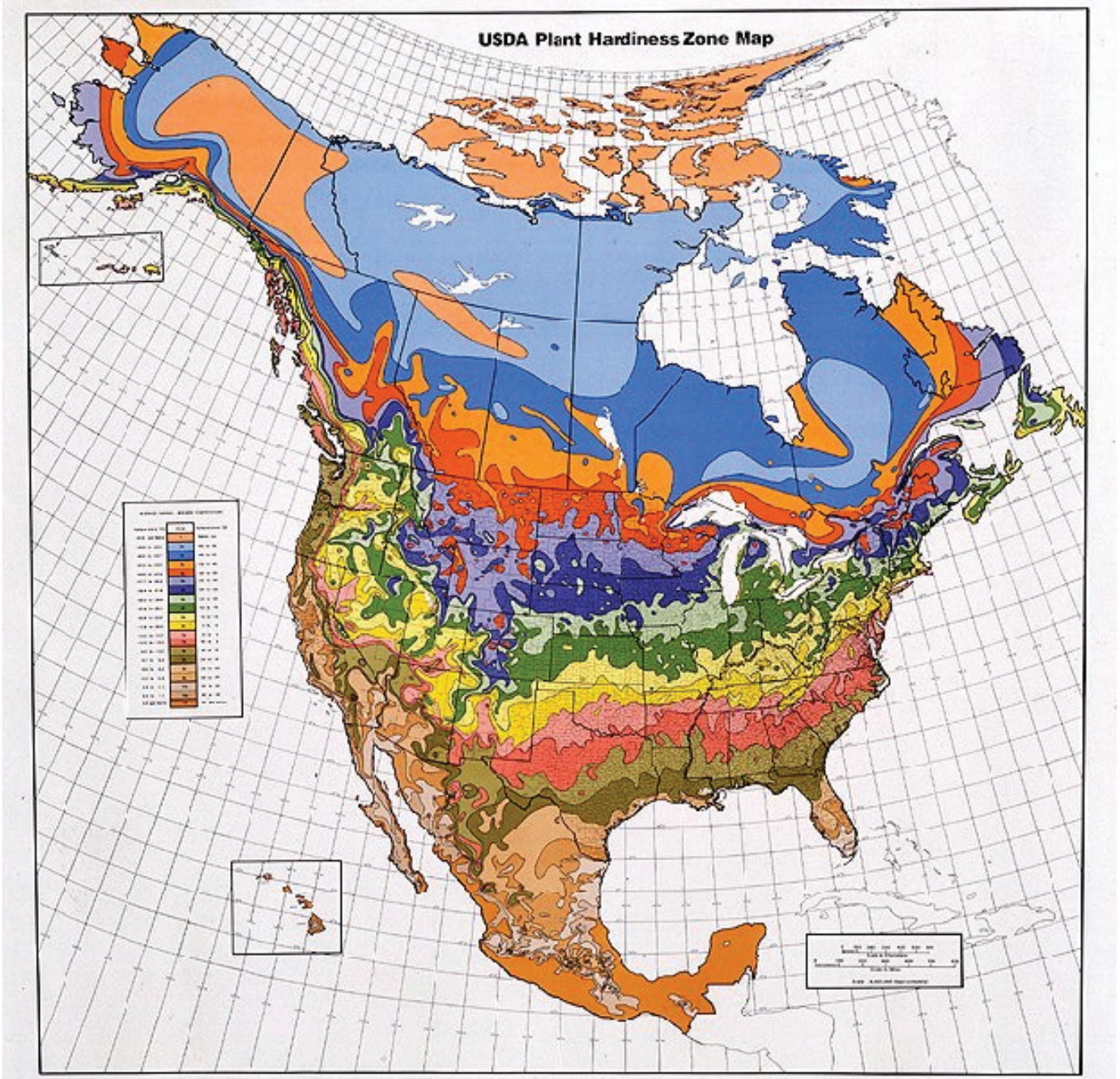


Figure 8. The United States Department of Agriculture Plant Hardiness Zone Map (1990) gives estimates of potential plant hardiness across North America based on average annual minimum temperatures. Low temperature survival is the most common measurement used to describe plant hardiness. Other conditions, such as heat, soil type, management practices, and plant genetics also factor into plant hardiness.



Figure 9. Turf can be a viable option in some shady landscapes. Turfgrass species selection and sunlight duration are important items to consider before trying to establish turf in a shady location. In heavily shaded areas, it is difficult to establish and maintain a healthy, dense turf stand due to light, water, nutrient, and space competition from established trees. In these situations, plants that are adapted to shade conditions should be used or the area could be mulched and left unplanted.

Nebraska is in zones 6 through 8. Heat may adversely affect plants that are adapted to cooler temperatures.

Plant Classification by Light Exposure

Full sun is at least six hours per day.

Full sun with reflective heat produces difficult growing conditions for plants. Reflected heat may come from sidewalks, driveways, plastic fences, and buildings.

Morning shade, afternoon sun typically occurs in areas with a south to west exposure. This type of growing condition can be extremely warm and damaging to plants.

Morning sun, afternoon shade typically occurs in areas with an east exposure. This type of growing condition is ideal for many plants.

Filtered shade occurs as sunlight penetrates through a tree canopy. The amount of shade below a tree canopy depends on leaf size and canopy density and height (*Figures 9*). Shade patterns move throughout the day and year, changing the amount of shade cast on an area.

Open shade conditions occur when a structure, such as a house or a fence, creates shade.

Closed shade occurs under decks or covered patios.

Preferred growing conditions are those in which a plant grows best. Conditions may include sun exposure (sun, shade, partial), moisture (wet, dry, evenly moist), pH (acidic, neutral or alkaline) and soil fertility (high or low). For example, most hostas prefer well-drained soil in shaded growing conditions.

Tolerant plants are able to grow in conditions that are not as ideal as preferred growing conditions. An example is daylily growing in a shaded area (*Figure 10*).



Figure 10. Daylilies will tolerate shade but prefer full sun conditions. Grown in shady conditions (right), daylilies will produce fewer flowers.



Figure 11. Many cool-season vegetable crops, such as lettuce, are long-day plants. Flowering in these plants occur as day lengths and temperatures increase. Once flowering begins in many cool-season vegetables, they become bitter. Many cool-season vegetables are successfully grown in the fall due to cooler nights and shorter day lengths.

Photoperiod is the amount of time a plant is exposed to light.

Short-day plants form flowers only when the day length is less than a critical minimum, usually about 12 hours in duration. Examples include spring and fall flowering plants, such as chrysanthemum and poinsettia.

Long-day plants form flowers only when day length exceeds a critical minimum, usually more than 12 hours. Examples include many of the summer flowering plants (Figure 11).

Day neutral plants form flowers regardless of day length.

Plant Classification by Origin

Native plants are those that are found naturally in a given area.

Adapted (introduced) plants are not native to a given area but are suited to the growing conditions found there.